Docket No. 5925.36003

"METER BOX LID"

SPECIFICATION

Background of the Invention

Field of the Invention

The invention relates to a removable lid for covering a utility box such as a water meter box.

Description of the Prior Art

In the past, utility boxes such as water meter boxes have been made of concrete or plastic with lids formed of the same material. U.S. Patent Nos. 2,883,853, 4,163,503, 4,726,490, 5, 423, 448, 5,394,601, and 5, 791,098 disclose different types of lids.

Summary of the Invention

It is an object of the invention to provide a new and useful, strong, heavy duty lid for a utility box and which may be used on concrete or plastic boxes. The lid comprises a member formed of a plastic material with elongated recesses formed in the lower surface which minimizes breakage of the lid. The recesses are spaced inward of the outer edges of the lid member. The recesses are generally parallel to each other and have lengths equal to a substantial portion of the length of the lid along which the recesses extend.

Brief Description of the Drawings

Figure 1 illustrates the upper side of one of the lids of the invention.

Figure 2 illustrates the lower side of the lid of Figure 1.

Figure 3 illustrates the upper side of another lid of the invention.

Figure 4 illustrates the lower side of the lid of Figure 3.

Figure 5 illustrates the upper side of another lid of the invention.

Figure 6 illustrates the lower side of the lid of Figure 5.

Figure 7 illustrates the upper side of another lid of the invention.

Figure 8 illustrates the lower side of the lid of Figure 7.

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Figure 9 is a cross-sectional view of Figure 2 taken along lines 9-9 thereof.

Figure 10 is a cross-sectional view of Figure 2 taken along lines 10-10 thereof.

Description of the Preferred Embodiments

Referring now to the drawings there is shown four lids 21, 21M, 61, and 61M which are compression molded from a suitable plastic material such as medium density polyethylene. Referring to Figures 1, 2, 9 and 10, the lid 21 comprises an upper side having a flat or planar upper surface 21U and a lower side having a flat or planar lower surface 21L. The upper and lower sides are rectangular with four edges 21A, 21B, 21C, and 21D. Formed in the lower surface 21L during the molding operation are two identical elongated, parallel recesses 23 and two identical, square recesses 27 and 29. The recesses 23 have outer edge 23A, 23B, 23C, 23D. The recess 27 has outer edges 27A, 27B, 27C, 27D. The recess 29 has outer edges 29A, 29B, 29C, 29D. Formed in the upper surface 21U during the molding process are two identical, circular recesses 31 and 33 which are generally aligned with the two square recesses 27 and 29 respectively. Also formed on each edge 21A, 21B, 21C and 21D are two spaced apart wedges 37 or lugs which extend outward from the upper surface 21U and taper downward to the lower surface 21L. The wedges 37 may be shaved or cut to the desired shape in order to allow the lid to fit into the top opening of the utility box. Also molded or drilled through the lid 21 is a finger hole 39 for gripping purposes to more easily allow the lid to be fitted to or removed from the utility box.

The purpose of the recesses 23 is to minimize breakage of the lid and the purpose of the recesses 27, 29 and 31, 33 is to receive remote reading equipment in the interior of the utility box and on the top of the lid 21. Apertures will be formed through the lid to provide an opening between the recesses 27 and 31 and to provide an opening between recesses 29 and 33 to allow connection between the interior an exterior equipment.

In one embodiment, the dimensions L1, L2, L3, L4, H1, H2, H3, H4, W1, W2, W3 and D in inches are about 16 ½, 14 ½, 10 ½, 12 ½, 1 ½, 1, 14/16, ¼, 2, 2 ½, 4 ¾, and 5 respectively.

Lids similar to lid 21 were produced but they did not have the recesses 23. If these lids were dropped on a hard surface, the lids would

crack in some instances. Also when a high vertical pressure was applied to the lids when they were supported at the outer edges, they would break. The problem was solved however, by forming the recesses 23 during the molding process. The lid of Figs 1, 2, 9, 10 was tested by dropping it on a hard surface and by applying a high pressure to its upper surface 21U with the outer edges of its lower surface 21L supported by means and the lid did not crack or break. It is believed that the improved results were obtained since the recesses 23 allowed a better heat transfer of the hot flowable plastic during the molding process and they enhanced curing of the plastic. The recesses 27 and 29 have solved the prior problem at least on the side of the lid on which they are located. The area of the lower surface 21L is greater than the total area of the recesses 23, 27, and 29 in the plane of the surface 21L.

Referring to Figures 3 and 4, the lid 21M is similar to lid 21 except that it does not have recesses 27, 29, 31, 33; or the opening 39; it has an opening 43 formed through the lid at its central portion with a cover 45 hinged to the upper surface 21U to allow manual reading of the meter in the utility box and it has three identical excesses 23. In Figures 3 and 4, the same reference numerals as used in Figures 1, 2, 9, and 10 identify the same components and except for the differences mentioned above, the dimensions of lid 21M are the same as lid 21. Referring to Figure 4, the outer recesses 23 are spaced about 2 ½ inches from the central recess 23. The opening 43 may have side dimensions in inches of 3 ¾ X 6 7/8. The lid 21M is compression molded from a plastic material such as medium density polyethylene.

Referring to Figures 5 and 6, the lid 61 is compression molded from a suitable plastic such as medium density polyethylene. It is similar to lid 21M except that it is longer; it does not have the central opening 43; it has 4 spaced recesses 23 and five spaced rows of circular recesses 63 in its lower side. The lid 61 has a flat or planar upper surface 61U, a flat or planar lower surface 61L; edges 61A, 61B, 61C, 61D; and wedges 67. The length, width, and height of the lid 61 in inches may be 26 ½, 15, and 1 ½ respectively. The recesses 23 have the same dimensions as recesses 23 of Figures 1 and 2. In the embodiment of Figures 5 and 6, adjacent recesses 23 may be spaced 3 inches apart. The round recesses 63 may have a diameter of 2 1/4 of an inch and a depth of 3/4 of an inch. Recesses 63 help perform the function of recesses 23.

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Apertures 65 and 67 extend through the lid 61 and are used as a touch read hole for use for reading the meter in the box and as a finger hole respectively.

Referring to Figures 7 and 8, the lid 61M is compression molded from a suitable plastic material such as medium density polyethylene. The lid 61M is similar to the lid 61 except that it has a central opening 71 with a hinged cover 73 for use for manual reading of the meter in the box. Apertures 65 and 67 are not employed and have in their place two circular recesses 63. In Figure 7 and 8, the same reference numerals identify the same components as shown in Figures 5 and 6. The dimension of the lid 61M may be the same as those of lid 61.

In the embodiment of Figures 1-10 the lengths of the recesses 23 are equal to a substantial portion of the length of the lid along which the recesses extend and are greater than one half of said lengths of the lid and are a little greater than ¾ of said lengths of the lid. For each lid, the area of the lower surface also is greater than the total area of the recesses 23 in the plane of the lower surfaces of the lid.

The median density range of the polyethylene used in forming the lids of Figures 1-10 is .938-.942.

Compression load tests were carried out on the lid of Figures 1-6, 9, 10 and on the lid of Figures 7 and 8. The tests were performed utilizing a 9" X 9" steel plate placed on the lid center. Prior to testing, each sample was placed on steel blocks around the perimeter of the lid to simulate the lip of the meter box.

Tests were performed on three lids of the embodiment of Figures 1-6, 9, 10. The three lids tested withstood a total load in pounds of 9380; 12,230; 8,910, respectively.

The lid of Figures 7 and 8 had a length of 26 inches and a width of 6 inches. Tests were performed on two lids of the embodiment of Figures 7 and 8. The two lids tested withstood a total load in pounds of 14,070; 12,070, respectively.

It appears that the lid of Figures 7 and 8 withstood a greater load since it did not have the recesses 27, 29, 31, 33 of the lid of Figures 1-6, 9, 10.

The lids described with respect to Figures 1-10 are all rectangular in shape. The plastic lids however may be circular or oblong in shape with planar upper and lower surfaces. All of these lids will have at least two parallel recesses 23 formed in their lower surfaces. The lengths of the recesses 23 will be equal to a substantial portion of the length of the

lid along which the recesses extend and greater than one half of said length of the lids. In addition, the area of the lower surface will be greater than the total area of the recesses 23 in the plane of the lower surfaces of the lid.